

CHAPTER 1

Anatomy of the Breast

Mammary gland (*glandula mammaria s. mamma*) is a pair organ, which relates to the type of the apocrine glands of the skin. It mostly occurs at the base on the large breast muscle (*m. pectoralis major*), partially on the front of ridge-shaped muscle (*m. serratus anterior*) and crossing the free edge of breast muscle, adjoins by its small section to the side of breast wall. In the average the base of gland reaches the external edge of sternum. The mammary gland is usually located at the level of the III to (VI) VII ribs, and from all sides (except the nipple and areola) is surrounded by fatty tissue. Between both mammary glands there is a deepening called cavity (*sinus mammarum*).

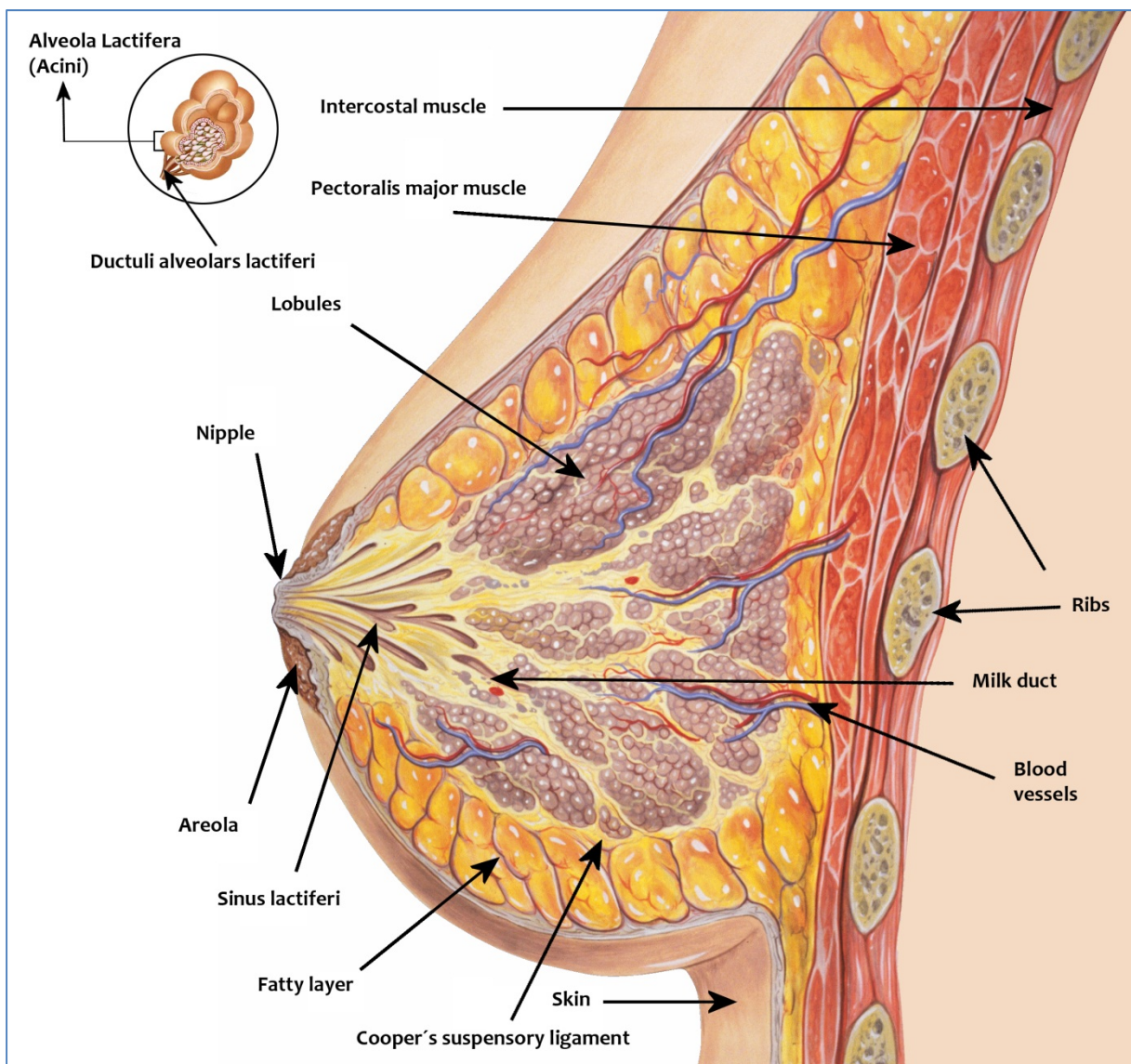


Fig. 1 Anatomy of a healthy breast

Out of the period of lactation the mammary gland has in average 10-12 cm in the diameter, with the thickness of 2-3 cm (D. N. Zernov). The weight of the gland varies in girls in the limits of 150-200 g, in the period of lactation 300-900 g. In the majority of the young healthy women the gland is elastic and has a form of hemisphere.



Professor of Moscow University D.N. Zernov

Approximately in the center of the most convex part of the gland, which corresponds to the level of the 5th rib, there is a pigmented section of the skin - the field of areola (*areola mammae*) surrounding the nipple, with a diameter of 3-5 cm, in an oval, circular or amorphous shape, in center of which comes out the nipple of mammary gland (*papilla mammae*). The circumference of the pigment of the areola are vestiges of sweat and sebaceous glands (Montgomery glands, there are about 15), which function during lactation.



Mammary gland is covered with soft skin. The skin, which covers the nipple and the field of nipple, is characterized by special softness and has the large number of small folds, in a form which resembles wrinkles. The color of the skin is various: it can be pink or brown depending on the general pigmentation of the skin. The intensity of the pigmentation of the field of nipple and the nipple of mammary gland is strengthened during the pregnancy.

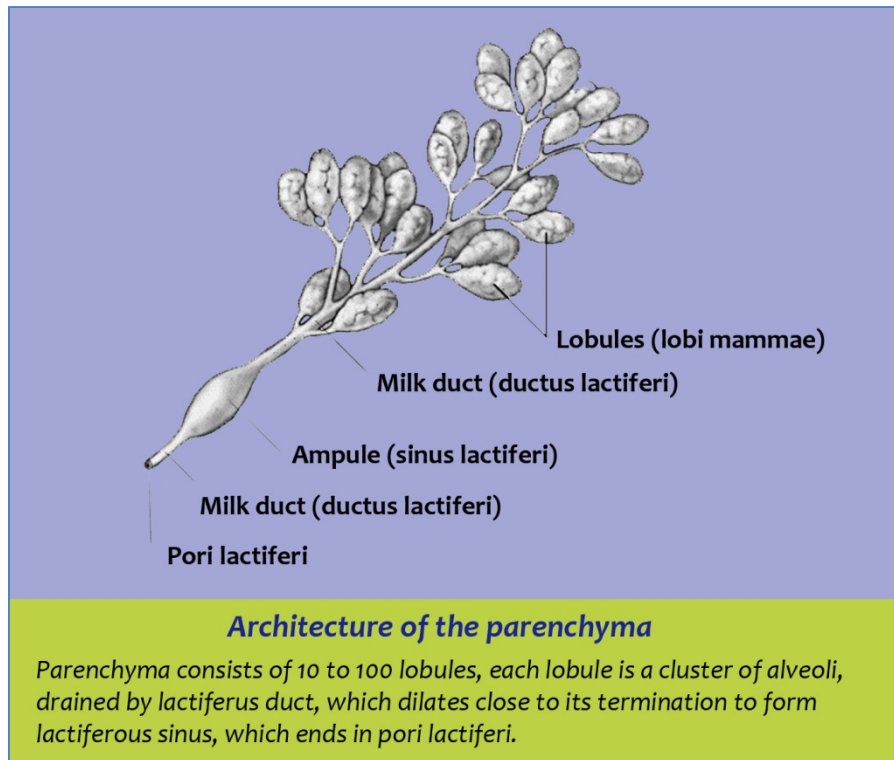
At the end of the period of lactation the gland decreases in volume as a result of the reverse development of the component elements of its glanderous part, but not to the extent, which was prior to the pregnancy.

At puberty the mammary gland has grape-like structure and consists of a set of bubbles - the alveoli, which are connected and form large individual cloves. The number of lobules (*lobi mammae*) in the breast is 15-20, inverted at the top of the nipple and divided from each other by the layers of connective tissue. Each slice of the breast is separated from other layers of loose connective and fatty tissue. The latter are passed also between the front body surface of gland and the deep layers of the skin and above the aponeurosis of breast muscle, forming the dense connective-tissue belts (lig. suspensorium Cooperi) in the form the grids (retinaculum), which are fastened to the collar bone. It is below, being split throughout entire length, connective-tissue belts form the capsule, in which is included the mammary gland. If hypodermic fatty layer is developed not very strongly, during the palpation of gland the granularity is determined. It depends on the fact that into the base of lig. Suspensorium Cooperi glanderous cloth gives small branches, which can be felt by palpation as

granularity. On strength and elasticity of capsule one or other form or another of mammary gland to a considerable extent depends (“standing breast”, “sagging breast”).

Each segment of mammary gland is divided into the lobules (*lobuli mammae*), which are isolated one from another by connective tissue. Each lobule consists of alveoli.

Fig. 2



The adipose tissue, which carries out all spaces between them, divided in the individual sections by connective-tissue grid, is located between the glandular body of gland and its external cover.

In the structure the breasts consist of alveoli. Each segment has its own excretory duct (galactophore, *ductus lactiferous*), going towards the nipple and opening itself to the surface of the nipple in a 8-14 pin hole (pori lactiferi 0,2-0,3 mm). The nipple has a conical or cylindrical in shape. There are flat nipples and inverted. Ducts pass into the milk sinuses (milky sacs, *sinus lactiferus*) that serve as reservoirs that collect the milk produced by the alveoli (diameter 0.5-0.7 mm). In the milk sinuses entry numerous branching and anastomosing milk ducts that until the onset of lactation end in thin blind tubes - alveolar milk passages that during pregnancy and lactation give rise to numerous alveoli. The so-called glandular field is formed around the ducts. **The greatest number of glandular elements is found in the upper-external part of the breast.**

From the time of puberty under the influence of hormonal ovarian function begins an intensive development of the mammary glands.

Size and shape of glands, the ratio of glandular, connective and fatty tissues of an individual varies, also vary with age, during pregnancy and lactation period. Its largest size it reaches the end of pregnancy and during lactation.

Anatomy of breasts on the outside is very simple. We can identify:

1. Nipple: (papilla mammae) the pointy tip at the end of the breast. This is where the milk comes out. Nipples can be protruded or flat or inverted.

- Protruding nipple: Most women have protruding nipples – that is, the nipples point outwards. About a third of all women have a flat or an inverted nipple.



- Flat Nipple: As its name implies, a flat nipple is one which does not stick out. It lies flush along the natural curve of the breast.
- Inverted Nipple: An inverted nipple is one where the nipple is sunken below the natural curve of the breast. It is indented inwards.



2. Areola: the colored region around the nipple, in a circular, oval and amorphous shape with the diameter from 3 to 5 cm. During pregnancy, the areola may get darker.

on the inside we can identify:

1. Alveoli: grape-like clusters of tiny rounded sacs where milk is made. These are located at the base of the breast just above the chest. A cluster of alveoli is called a lobule and a cluster of lobule is called a lobe.

Parenchyma consist of 10 to 100 lobules, each lobules is cluster of alveoli, drained by lactiferous duct, which near its termination is dilated to form lactiferous sinus.

2. Milk ductules: small tubes or canals where milk travels out of the alveoli towards the nipple. Larger tubes and canals are called milk ducts.
3. Milk Pools: larger tubes where milk accumulates right before it comes out of the nipple. Milk pools (also called milk reservoirs, or **lactiferous sinuses**) are under the areola, so when baby latches on, his mouth should go around a good proportion of the areola so his tongue can push the milk out of the milk pools.

4. Nipple openings: this is where the milk comes out. There are multiple openings on each nipple, a 8-14 pin openings (pori lactiferi 0,2-0,3 mm).

Supportive structures.

- Fat: just under the skin is a layer of fat. Women who have big breasts have more fat surrounding their breast. Fat does not have a role in making breast milk, its function is to surround and protect the milk-making lobules.
 - Muscle: tissue that connects breasts to ribs, collarbone, and upper arm.
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DEFINITIONS

Cooper's Suspensory Ligament (*fibrocollagenous septa*) is a connective tissue in the breast that helps to maintain structural integrity. The ligaments run from the clavicle and the clavi-pectoral fascia branching out through and around breast tissue to the dermis of the skin overlying the breast. The intact ligament suspends the breast from the clavicle and the underlying deep fascia of the upper chest. This has the effect of supporting the breast in its normal position, and maintaining its normal shape. Without the internal support of this ligament, the breast tissue (which is heavier than the surrounding fat) sags under its own weight, losing its normal shape and contour.

Duct

The system of epithelial-lined branching tubes which conducts secretions to the nipple. The largest ducts are located at and below the nipple. The smallest true ducts are the terminal ducts which enter the lobules.

Lobule

A group of ductules and the intralobular portion of the terminal duct arranged in an ovoid formation, and possessed of its own distinctive areolar intralobular stroma.

Ductule

The smallest, blindly ending tubular epithelial structures that make up the resting mammary gland. They arise from the intralobular portion of a terminal duct. A group of ductules and the intralobular portion of the terminal duct form a lobule. The term ductule is reserved for the resting mammary gland. The terms acini or alveoli are reserved for the same or similar structures which show secretory activity in the prelactating and lactating gland.

Alveoli or acini

A term reserved for ductule-like terminal secretory units present in the prelactating and lactating mammary gland.